arm

PROJECT CASSINI

Ensuring a Secure Cloud Native Experience at the Edge

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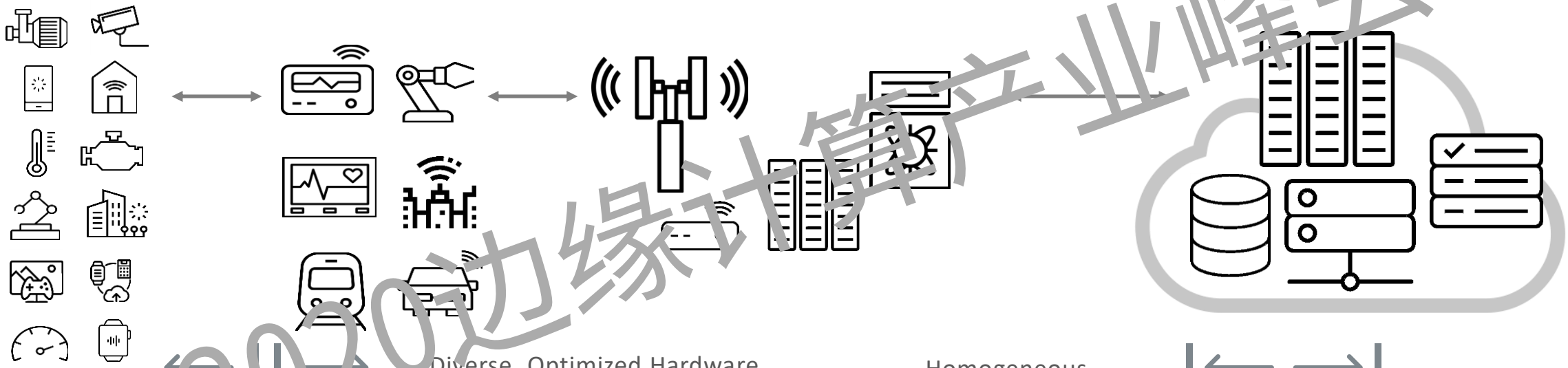
A Frictionless Edge Unlocks Value From the IoT

Data streams from 1T connected devices	Industry 4.0 compute platforms	Open platforms for 5G RAN	Intent based Networks	TCO-driven data center compute



Diverse, Optimized Hardware ⟷ Homogeneous

Aggregation of Software development ⟷

OT – IT Convergence ⟷

Opportunity	Leverage cloud native software ecosystem across diverse silicon base to service Edge Compute market

Device to Cloud – the Arm-powered continuum

arm CORTEX-M Low Power IoT

arm CORTEX-A High Performance IoT

arm NEOVERSE Infrastructure

Endpoints

IoT / Edge Gateways

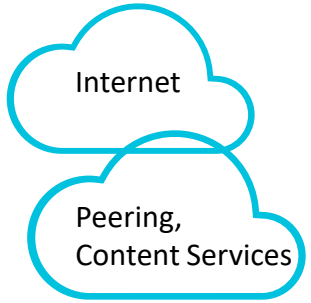
Edge Servers, Wireless & Wireline Network Edge

Cloud / Data Center

Industry 4.0

- Industrial Gateways
- Smart Manufacturing
- Smart Cities

- 5G Base stations
- Microcells
- Access & Edge Routers
- Switch, UTM, Smart-NIC



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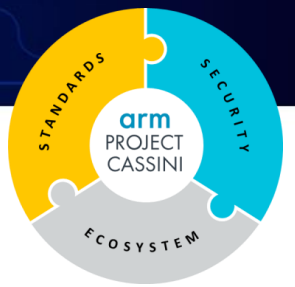


Project Cassini Summary

Initiative to ensure a secure, cloud-native experience across the Arm edge ecosystem

- ✓ Designed to support and enable diverse Arm based hardware
- ✓ Enables the ecosystem to leverage the significant investment made in cloud native software

Made up of three main components

- ✓ Robust standards leverage software development, but allow for & celebrate hardware diversity
- ✓ Security APIs & certification that can be trusted by developers across workloads and ecosystems
- ✓ Cloud native software stacks and reference use cases

Tangible benefits across the value chain

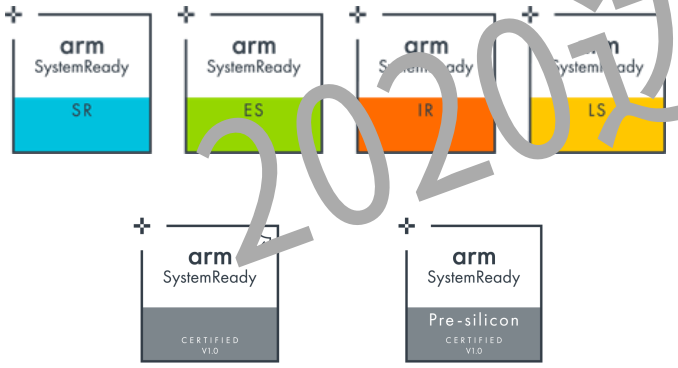
- ✓ Provides choice and optimized hardware (diversity) for ODM, OEM, and end users
- ✓ Reduces cost and friction of supporting Arm for ISVs and System Integrators

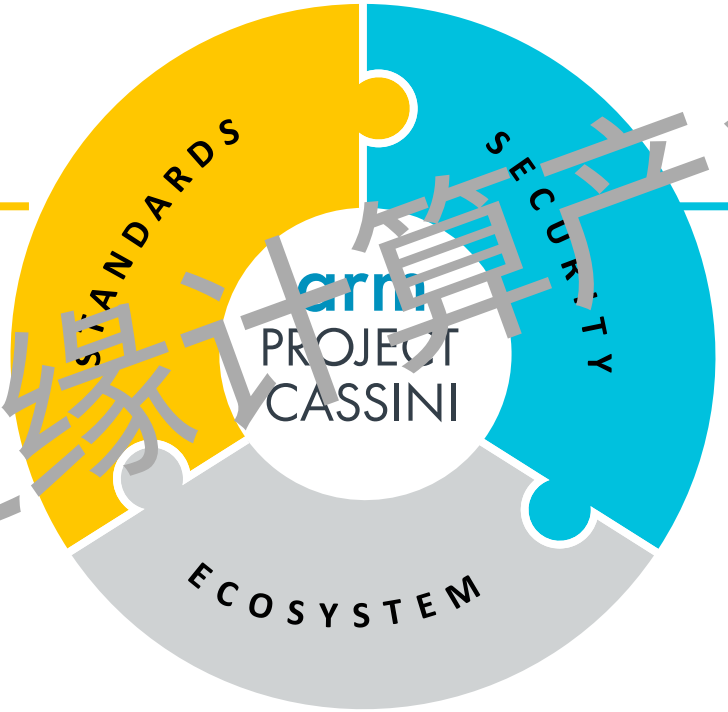
Project Cassini

Ensuring a cloud-native experience across a diverse and secure edge ecosystem

arm SystemReady

- Hardware, firmware specifications
- Certification program





PARSEC

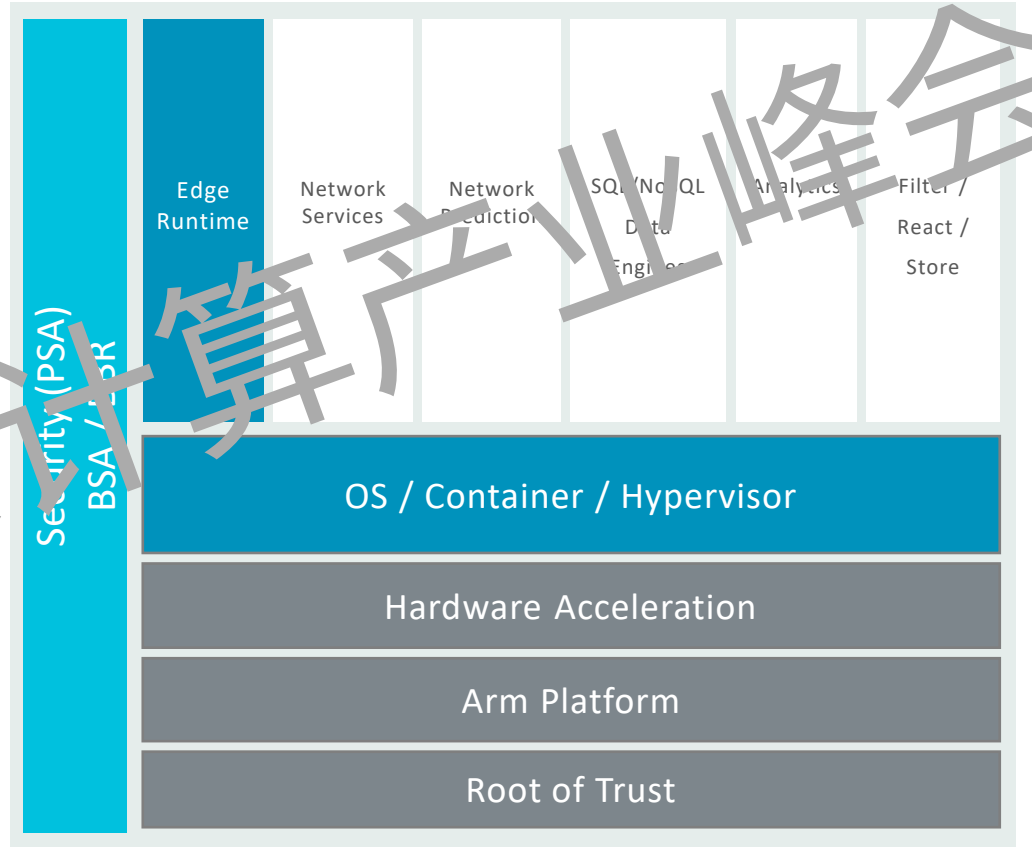
- Security Certification program
- Open API for cross-platform security services

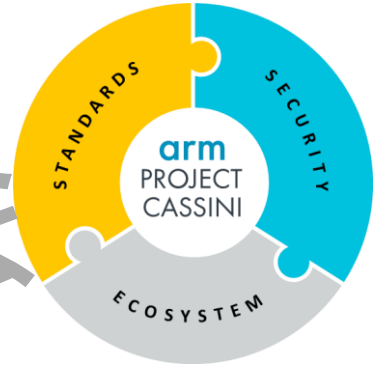
Cloud Native Stacks

- Edge Solution Reference Implementations

What Defines a Cloud Native Edge Device?

- Network-connected, managed
- Runs general purpose OS
- Supports virtualization
- Implements Hardware Root-of-Trust
- Software-defined device functions





Arm
Silicon Partner
Arm / ISV
OEM / End-user / ISV

Standards: Arm SystemReady

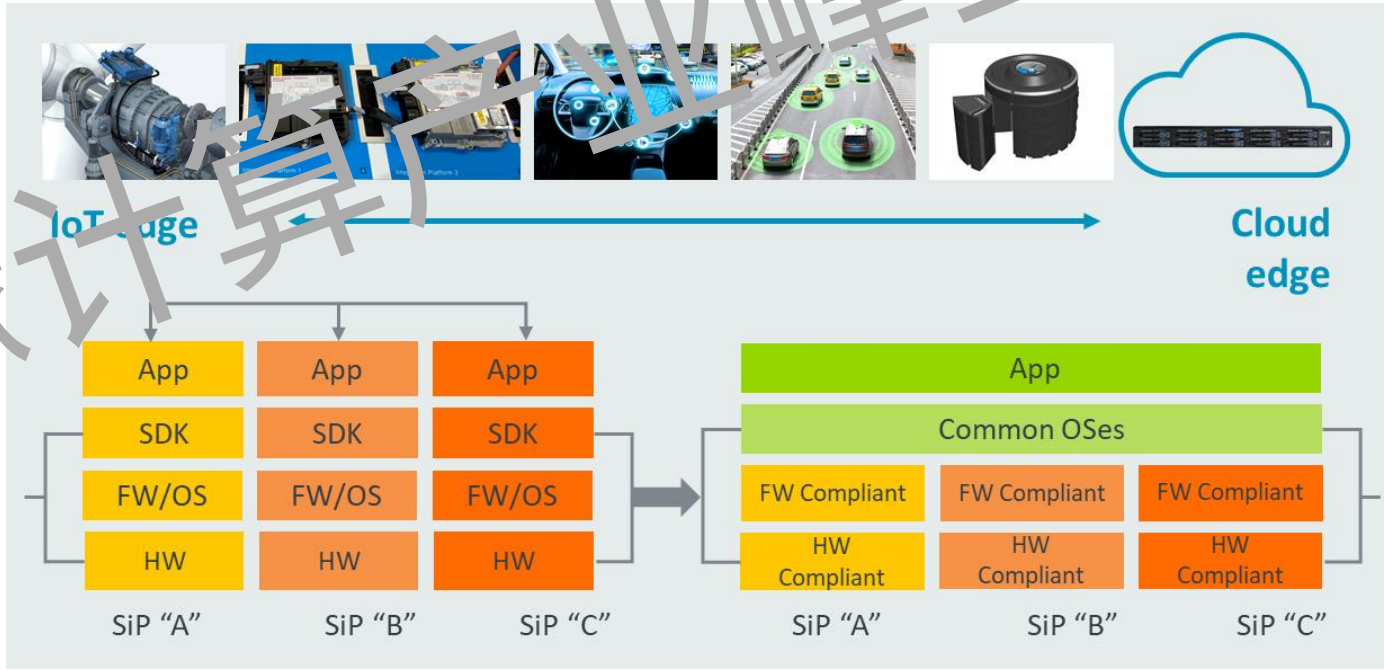
Hardware and Firmware Standards + Certification

Implementation standards around the Arm architecture: HW & FW

Standard OS, containers and Hypervisors simply 'work' on Arm

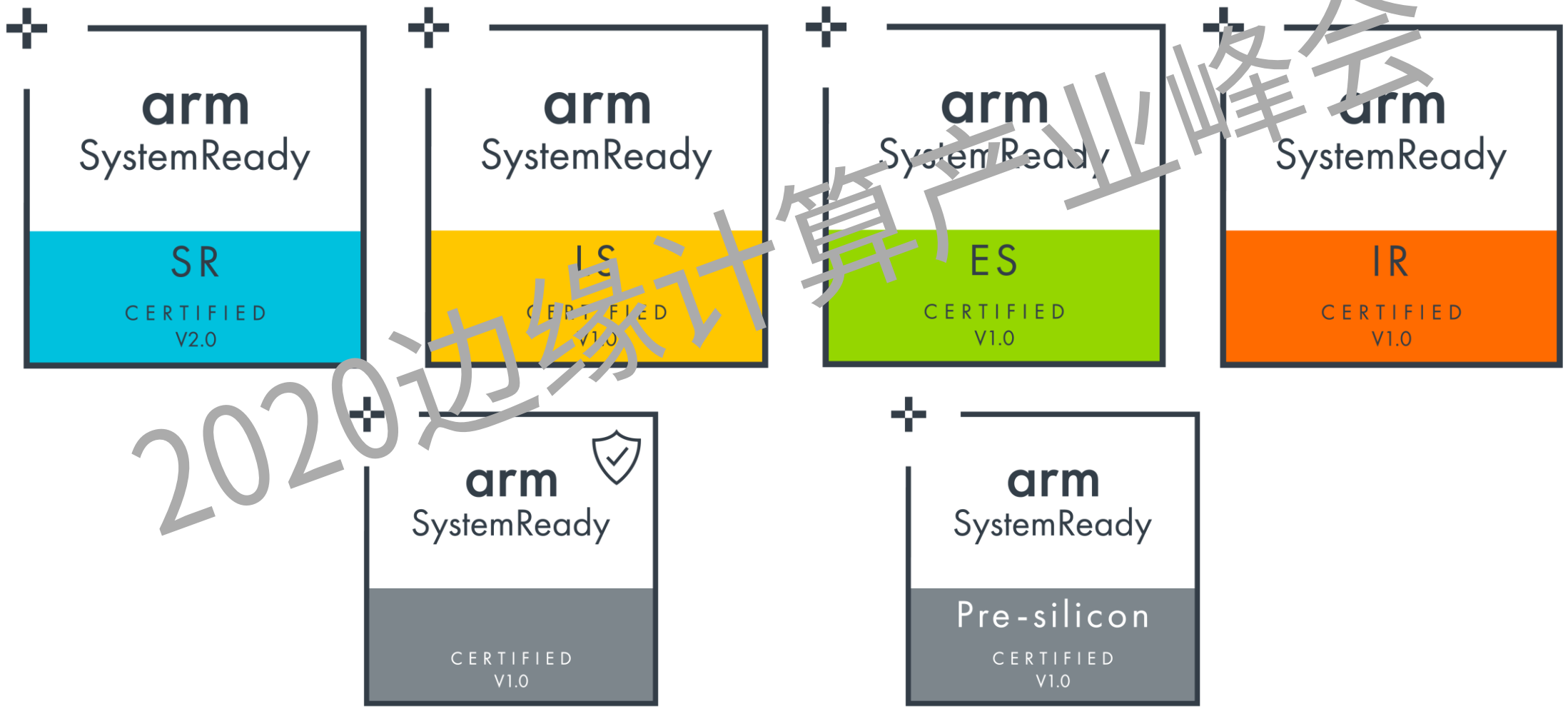
Multiple certification 'bands' allow hardware flexibility

- 'SR' (ServerReady) – targets homogeneity in the cloud/data center
- 'ES' (Embedded Server) – brings enterprise workloads to diverse Arm hardware
- 'IR' (IoT Ready) – runs community distros on IoT platforms



arm SystemReady

One Program, Multiple Bands



SystemReady Simplifies Landing Distros on Arm Platforms

Silicon Partner

SoCs are targeted across market segments

SystemReady Hardware & SDKs provide a standards-driven baseline for ODMs, OEMs & ISVs

Deploy a cloud-native stack with minimal to no custom engineering

CPU

AI

GPU

FPGA

ASIC

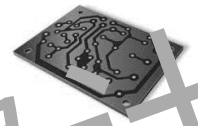
High-performance IoT Gateways

OT/IT convergence systems

Industry 4.0 platforms

Enterprise Edge Networks

Carrier Edge Servers



SDK

SDK

SDK

arm SystemReady

Windows
Integrity
SuSE
Android
OpenWRT
FedoraIoT
Linux
Ubuntu
ESXi
Yocto
CentOS
OpenSUSE
MentorLinux
SLES
WindRiver
DIY
VXWorks
RedHat
IoT
FreeBSD
Debian
QNX

PSA for constrained IoT devices

The open device security framework, with independent testing

STAGE 1

Analyze

Threat modelling

STAGE 2

Architect

Hardware and firmware architecture specs

STAGE 3

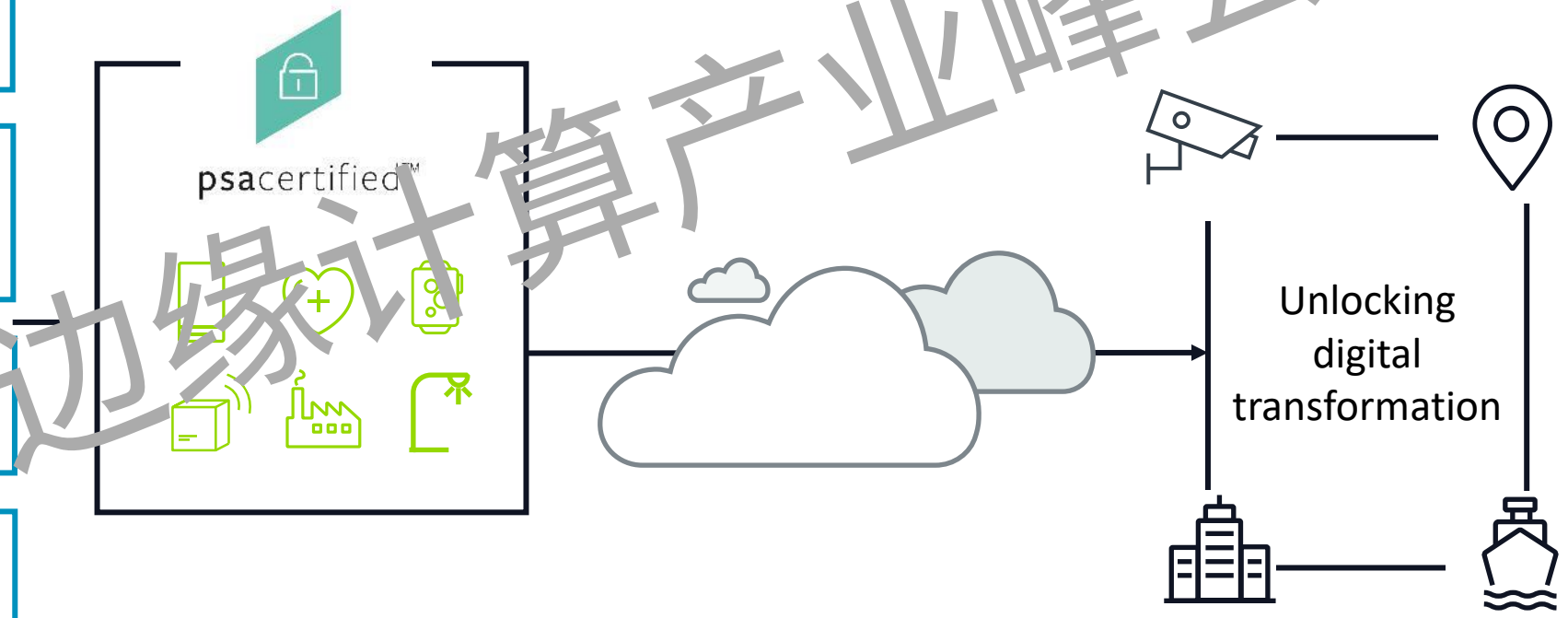
Implement

Hardware and software

STAGE 4

Certify

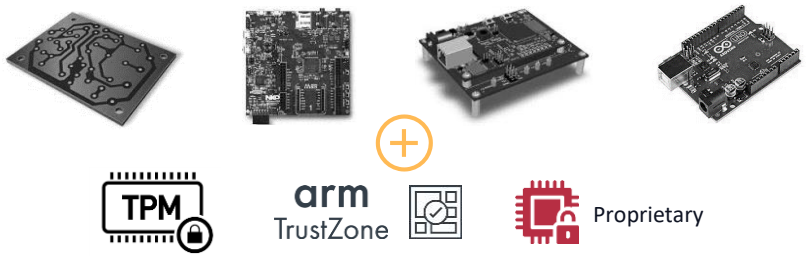
Independently testing SoCs, devices and OSes



PSA: enabling right-sized device security

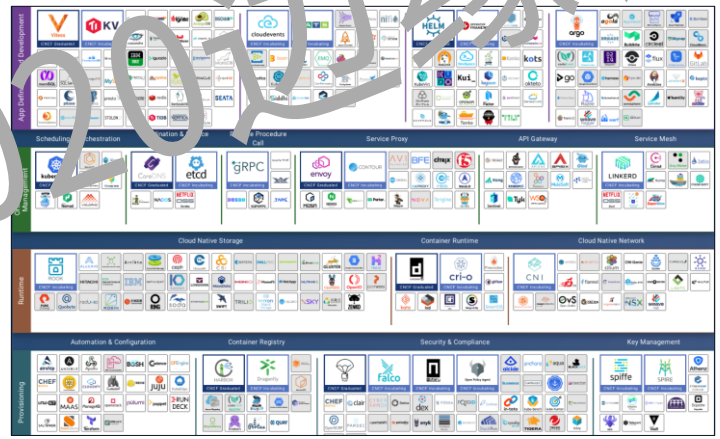
A secure baseline with PSA Certified & PARSEC

Varied RoT implementations



Fragmented interface to System Software

Security services for cloud native apps



- An objective assessment of quality of implementation for device RoT
- Builds assurance in the ecosystem that devices have a security baseline aligned with key standards and regulation

PSA certified™

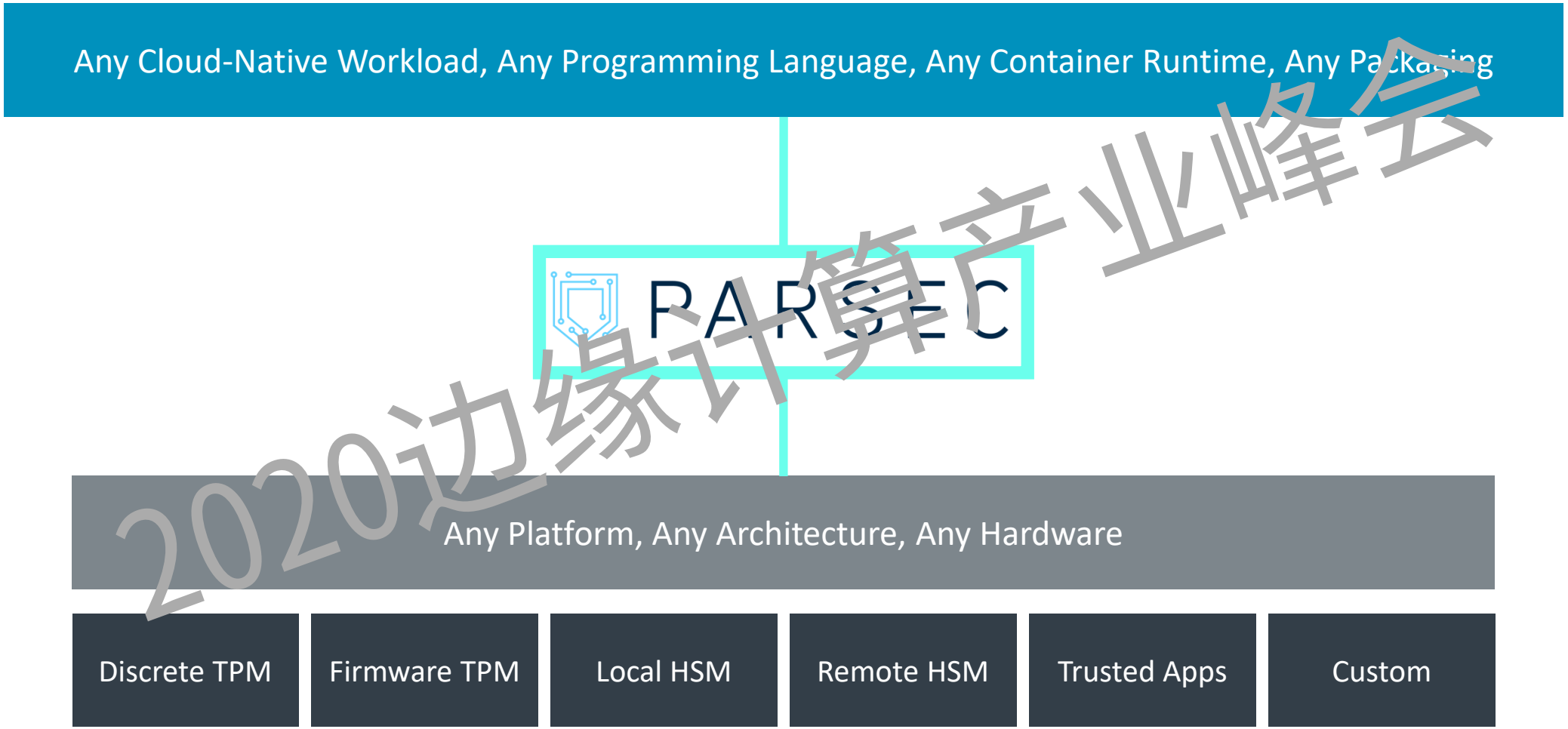
- SystemReady **Security profile** ensures that security features are surfaced to software according to industry standards

- PARSEC provides secure RoT abstraction to applications across platforms
- Solves industry-wide problem in an architecture-agnostic, open manner

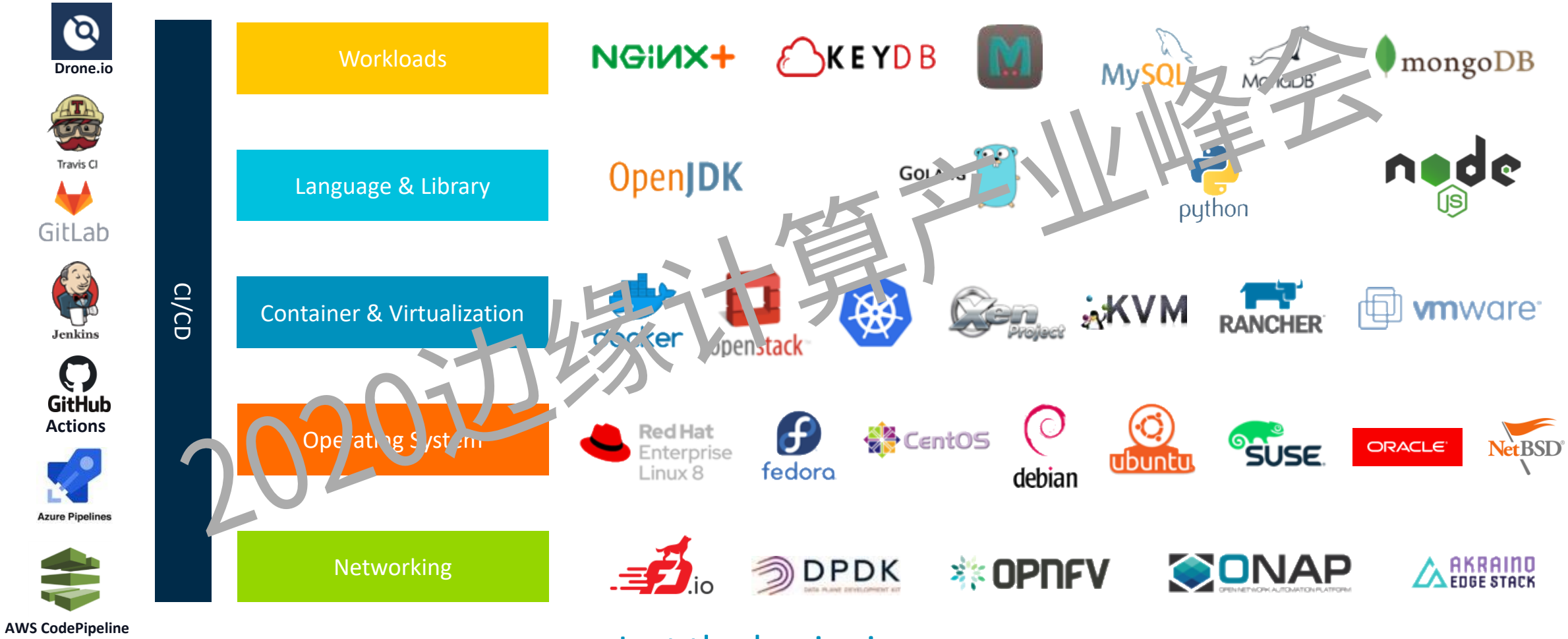
PARSEC

CLOUD NATIVE COMPUTING FOUNDATION

The PARSEC Vision



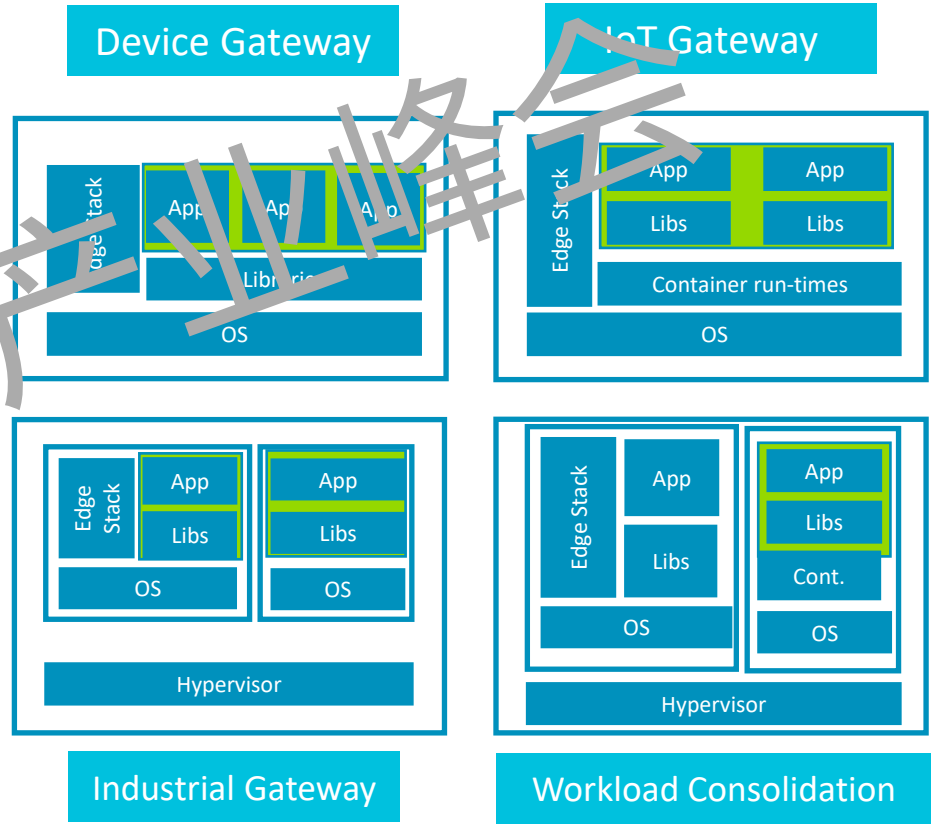
Bringing Arm Cloud-Native Ecosystem Successes to the Edge



Just the beginning…

ODM Use case: Workload migration

- Challenge
  - SW application standardization across multi-arch Tier-1 ODM product portfolio
  - Migrating workloads from x86 to Arm has been too demanding - making it simpler to sell non-optimal x86 solutions
  - Majority demand from end-customers for Arm based products
    - Smaller form-factor, lower power, fan-less, vendor choice
- Project Cassini Solves ODM barriers to Arm deployments
  - Enables at-scale deployment, security and management experience they are used to, while keeping the value of Arm's diverse and vibrant ecosystem




Wireless Sensor Modules


Remote I/O & DAQ Devices

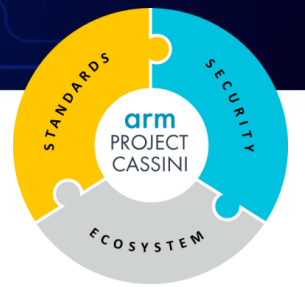

Machine Vision


RISC-Based Gateways


Embedded Automation PCs


Control IPC


Intelligent HMI



Use Case – Smart Cities

Smart City Platform for urban deployments

Challenge

- Need Simplified consistent SW deployment, portability and management experience across a diverse OEM supply chain to speed implementations
- Manage devices at scale through the cloud
- Multiple SIP, OS, OEMs, Applications and System Integrators
- Virtualized Gateways hosting cloud-native stacks, securely managed and orchestrated remotely

Solution

- Project Cassini enables Interoperability of HW + SW across a complex and diverse set of services
- Low overall cost (Deployment, servicing, updates)
- End to end, top down security
- A continuum of Arm devices, from endpoints to Servers

The Project Cassini Advantage

	Challenges	Project Cassini Value proposition
Silicon Partners	• Narrow, fragmented, shrinking SAM • Costly undifferentiated software	• Defends & expands market opportunities • Resources can focus on differentiation
ODM / OEM	• SW investment is a barrier to silicon choice paves way for architecture lock-in	• More diverse and optimized silicon options
ISV / OSV	• Cannot support unique software ports for diverse hardware	• Create unified ports for the entire Arm ecosystem
System Integrator	• Need to choose between *deployability* or optimized hardware	• Deploy across diverse hardware platforms
IT / OT	• Struggling to integrate IoT devices into their IT management systems	• Enables IoT devices to be easily updated, managed & secured with no truck roll

Engaging on Project Cassini

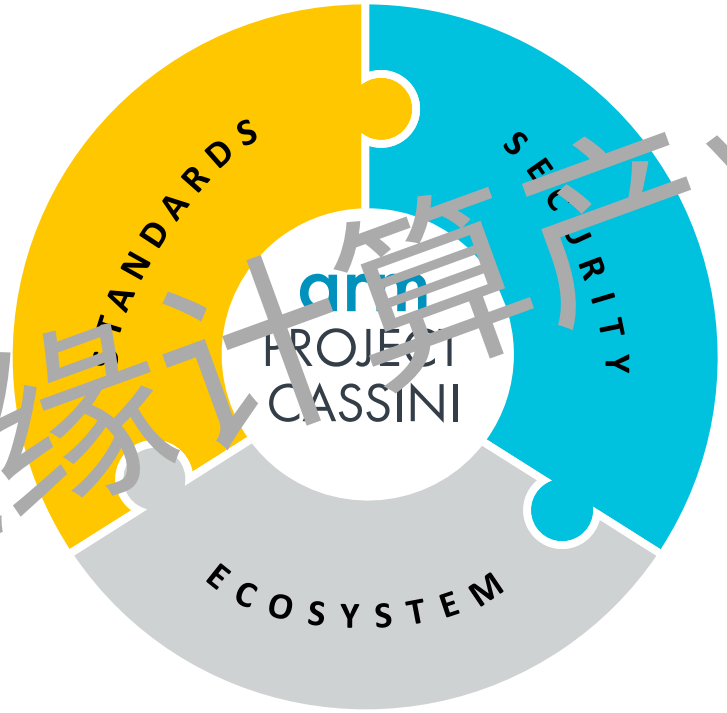
arm SystemReady

Adoption

- Silicon Partner SoC design
- Silicon Partner reference boards
- ODM Commercial portfolio
- OEM in-house platform designs
- EDA Partners
- Standard off-the-shelf or community OS distro and Hypervisors

Advocacy

- OSVs/ISVs
- Cloud, Telco, Enterprise OEMs
- System Integrators



psa certified™

- Silicon Partner - SoC
- ODM Commercial portfolio
- OEM in-house platform designs

PARSEC

- Standard OS and Hypervisors
- Virtualization, orchestration runtimes
- IoT platforms and Edge runtimes
- Independent Software Vendors

For more information, please visit → arm.com/solutions/infrastructure/edge-computing

Focus Partnership – IoT Gateway OEM

Partner

ADVANTECH

Lenovo

华北工控 NORCO

宏电 Hongdian

More Partner coming…

Why is this important?

- Proof of concept for Cassini and edge ready standards:
  - Establish cloud-native experience on Arm
  - Secure infrastructure edge
- Understand, solve partner barriers to deployment
- **Increase the number of Arm-based gateways in partner portfolio**

Engagement status?

- MOU signed with **Advantech** and **Lenovo** in focused on **4 workstreams:**
  - Platform Standards
  - Edge Security
  - Distributed Edge Compute
  - Joint go-to-market
- We are **now running virtual workshops** to cover all workstreams and align on priorities and deliverables


Wireless Sensor Modules


Remote I/O & DAQ Devices


Machine Vision


RISC-Based Gateways


Embedded Automation PCs


Control IPC


Intelligent HMI

谢谢

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